

Sheet #3

TWT

- 1- A TWT has a helix structure with 62 turns per inch, the helix has a diameter of 0.12 inch, calculate the anode voltage required to operate the TWT.
- 2- A helical TWT has a helix length of 15 cm and the length of the wire is 175 cm, the tube O/P power is 500 W, the efficiency is 15%. If the tube has an overall gain of 19 db, find:
 - a) The beam voltage and current.
 - b) The dissipated power.
 - c) The electronic gain.
- 3- A TWT operate in the frequency range from 11 to 18 Ghz with central frequency 15 Ghz, the anode voltage and current are 1500 V, 3 mA, the output power of 60 mW. If the tube gain is 35 db, the helix length $L = 20$ cm and the attenuation = 16 db. Find the helix impedance.
- 4- In the previous problem compare between the velocity of the useful wave and the electron beam velocity.
- 5- A TWT has the following parameter: $V_o = 3$ KV, $I_o = 30$ mA, $Z_o = 10 \Omega$, $N = 50$ turns and $F_o = 10$ Ghz. Obtain value of:
 - a) Gain parameter C.
 - b) Power gain in db.
 - c) The three forward propagation constants.
- 6- A TWT has the anode voltage 1067 V, the helix length 20 cm, if the same helix is compressed to 15 cm. What should be the anode potential for proper operation. (neglect the change in helix diameter).

Best wishes of success